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STUDY OF NEED

for a

PLANT MATERIALS CENTER IN COASTAL PLAIN AREA

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GONE WITH THE WIND (AND THE WAVES)

Giant waves and gale winds knocked out unvegetated dunes, destroyed homes.

Dunes rebuilt after storm offer some protection but won't last or build themselves higher without vegetation.

THE NEED

The billion dollar Atlantic coastal storm of March 1962 focussed attention dramatically and tragically on the need of a plant materials center somewhere along the eastern seaboard, ideally in centrally-located New Jersey. Such a center would seek, test, develop and distribute plant materials that would hold protective dunes in place against the destructive force of wave and wind.

The 600-mile-long Coastal Plain stretching from Cape Cod, Massachusetts, to Kitty Hawk, North Carolina, presents many coastal and inland problems in soil stabilization. The most urgent and dramatic need is to stabilize the coastal dunes denuded by the devastating storm of March 6-7, 1962. Miles of sand dikes have been constructed since the 1962 storm to protect shore properties, but these lie largely bare and unprotected from wind and wave.

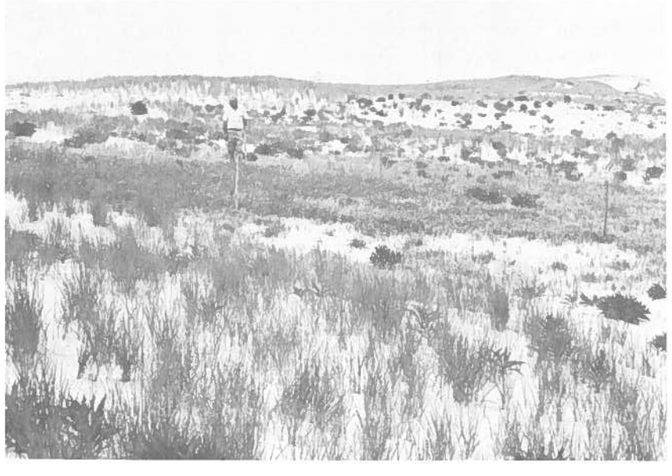
The March storm showed conclusively that dunes of proper height and breadth which were covered thickly enough with the right vegetation afforded protection to adjoining properties. Bare and poorly vegetated dunes, worn down by previous erosive forces, were wiped away by the raging sea. Left unprotected, property suffered heavy losses. Homes, stores, boardwalks and roadways were badly damaged or destroyed. In many cases, the land on which homes stood vanished in the ocean.

Vegetated dunes stand guard over these homes.

While the dunes took a battering from the terrific storm, these homes were not damaged.

Vegetation is a key in the solution of many erosion problems. But little is known about dune vegetation. Natural stands of beach vegetation are generally thin and scattered, although inconclusive work indicates they respond and improve with fertilization. No effort has been made yet to improve American beachgrass through selection and breeding; yet it offers the same potential for development as has been accomplished with forage crops and other plants in effective use by American agriculture.

Trial planting under good management at Island Beach State Park shows promise. These plants and methods need further study.



Local people plant beachgrass to hold dunes together. But other and better plants and techniques are needed if people are to do a lasting and more effective job.

A plant materials center located to serve the Coastal Plain would assemble and compare native and imported sand-stabilizing species. Besides American beachgrass, such species as European beachgrass, Japanese sedge, and various panicgrasses offer promise for selection and test on the pioneer (front) zone of sand dunes. For dune areas other than the pioneer zone, the Center would test woody and herbaceous plants which afford permanent protection under the stable and highly infertile conditions usually present. Plants such as beach plum, rugosa rose, bayberry, panicgrass, and broomsedge are known to persist on salt-sprayed back-dune areas. No attempt, however, has been made to select superior types or to develop establishment and other cultural methods.

Those showing particular promise as strongly spreading, heavy-seeding, and long-lived plants adapted to mid-Atlantic dune conditions would be further tested on off-Center plantings. Final selections would then be made. Foundation seed and plant stocks of the outstanding species and strains would be maintained at the Center. Propagation materials would be made available from these for private commercial production.

The work of a plant materials center does not stop with the development of improved plants. Cultural methods are developed for establishing and maintaining the improved species on newly-built dunes, and for rejuvenating old dunes with better plants or treatments. Also, techniques of commercial production would be developed for each new or improved plant. Such information is valuable to potential commercial producers. It would help in the establishment of a new seed and plant industry badly needed in the Coastal Plain area.

Thick stand of American Beachgrass (right) shows effect of fertilization. Area at left was not fertilized. Further study is necessary to find best application.

This planting of Japanese sedge shows promise and emphasizes the need of more study of imported plants

Although dune protection is the immediate and dramatic problem, there are many other erosion control and related conservation problems with which the Center would deal. Typical broad conservation problems throughout the Coastal Plain which lack suitable vegetative solutions are:

1. Eroding streambanks, tidal riverbanks, and dikes.

2. Critical areas of exposed subsoil, infertile or acid materials, and constructed soil areas; such as watershed structures, borrow pits, sand and gravel pits, industrial park areas, and highway embankments.

3. Waterways and outlets constructed on light, drouthy soils under critical slope conditions. Better adapted plants having high resistance to hydraulic forces are needed, as well as techniques for establishing the plants under the conditions prevalent.

4. Areas for recreational and urban use where plant cover must have esthetic values, resist wear, and survive with little or no care.

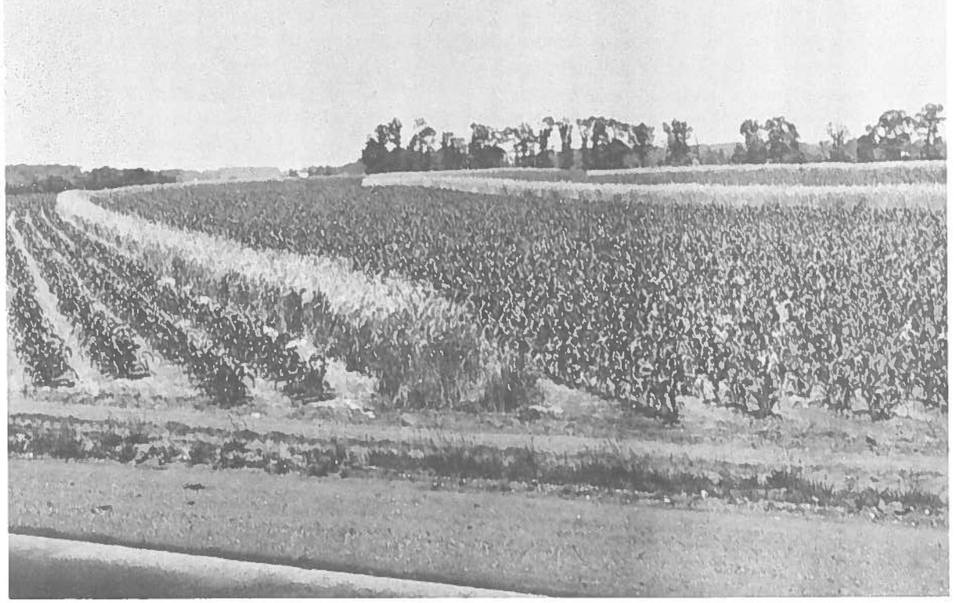
5. Light sandy soils which require windbreaks to reduce crop damage from wind-driven soil particles. There is opportunity for selecting plants which make more effective windbreaks and provide income from trimmings or provide wildlife food and cover.

6. A serious lack of adapted, productive, forage grasses and legumes tolerant to high temperatures, moderate fertility, and dry soils.

7. Better plants providing wildlife food and cover for upland game and songbirds. Plants which provide food and cover during the critical winter period are particularly scarce. There is intense interest in songbirds in the urban centers of the Coastal Plain. This is true also of upland game which furnishes valuable recreational release for the urbanite.

Tidal riverbank erosion takes a heavy annual toll. Makeshift structures and plantings are not the answer.

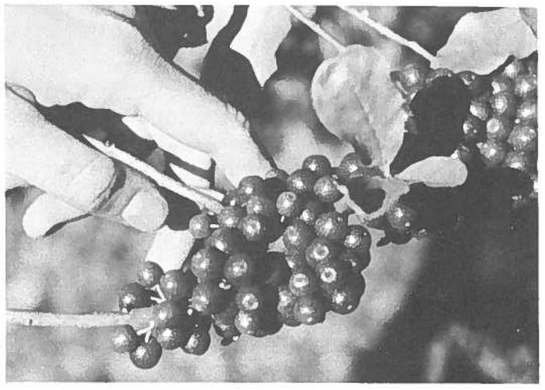
Windbreaks protect land and crops against damage. More study would reveal the best windbreak materials for coastal areas.



Strips of rye do a temporary job in protecting row crops. Better plants for this job could be developed at a plant materials center.

"Autumn olive" is an outstanding Fall-fruiting shrub used as food and cover by more than 20 Northeast songbirds and game animals. Its development was the result of SCS plant materials work.

Further selection is needed to extend its range of adaptation and season of food production.



Autumn olive berries. A bird's-eye view of a square meal!

Herbaceous and woody plants from the Big Flats Plant Materials Center are being finally compared and evaluated for wildlife use at field locations in the Piedmont and Mountain sections of the Northeast.

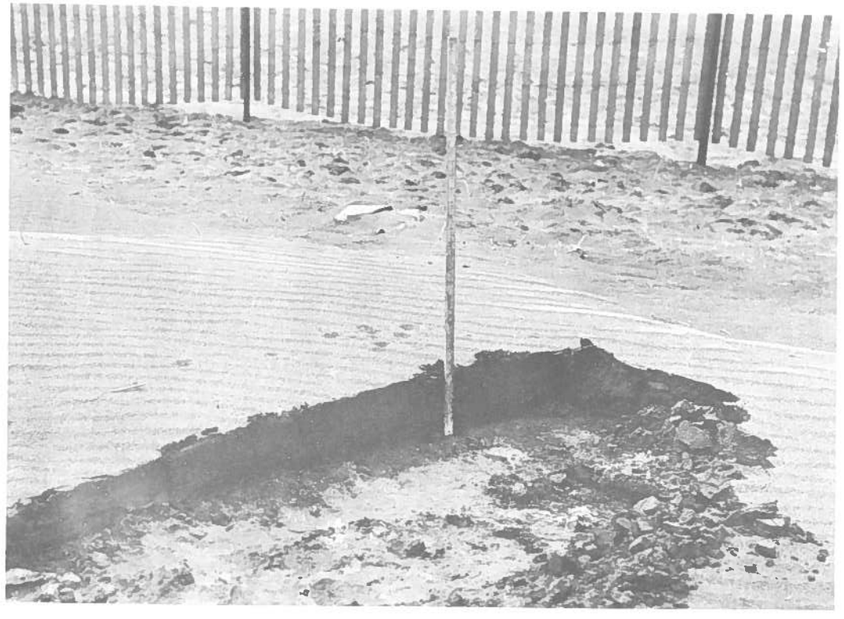
Plants developed at Big Flats are rarely adapted to the Coastal Plain.

Light sandy soils erode easily when water is concentrated in outlets.

Vegetation can be established in gently sloping waterways. But unless it is well adapted, it may be short lived or erode away.

On steep slopes, gullies form in waterways before vegetation gets established. Species and techniques need to be improved.

Wind erosion is a serious problem on light soils.



Snow fences pile up soil blown from fields not protected against wind erosion.

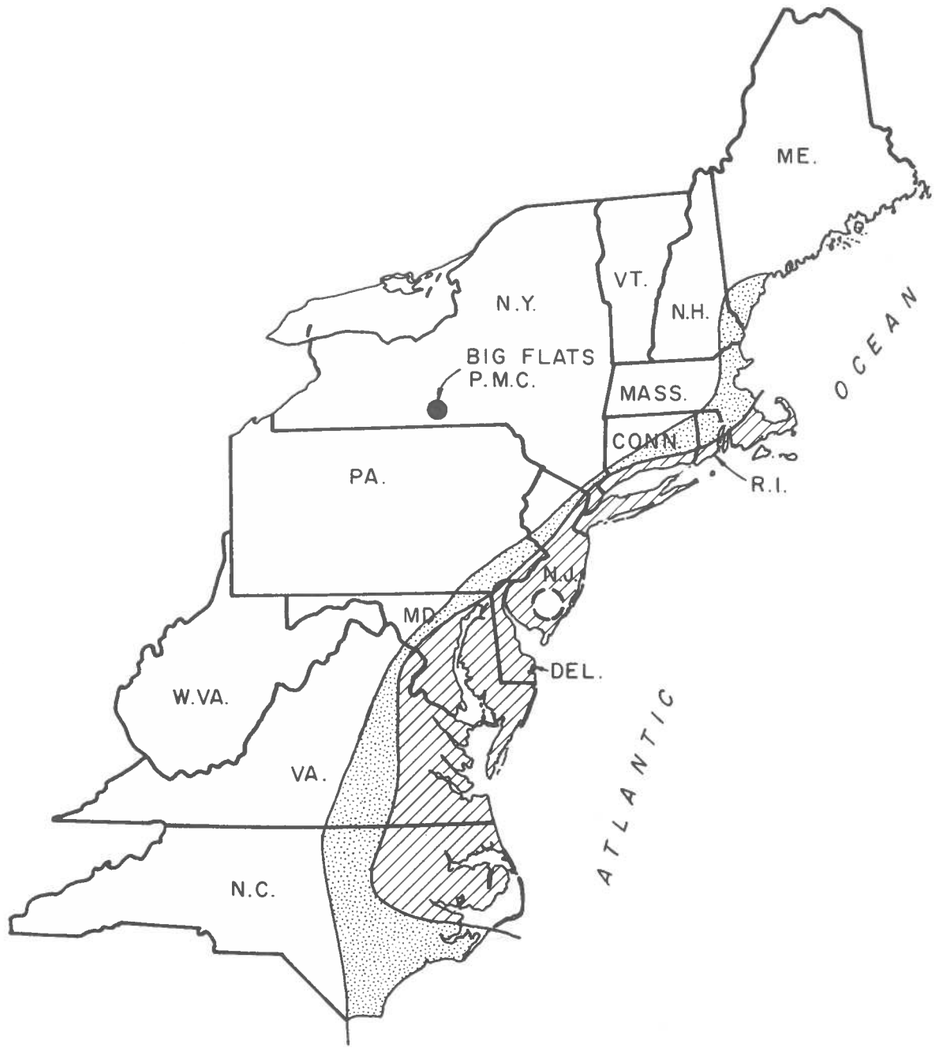
MEETING THE NEED

In recognition of the need for solving vegetative problems in soil and water conservation, since 1953 the Congress of the United States has authorized and specifically provided funds to the Soil Conservation Service, U. S. Department of Agriculture, for the establishment and operation of 18 plant materials centers. Working cooperatively with state experiment stations and other state and Federal agencies, these 18 Centers serve major land resource areas of the United States. Not any, however, are located so that they have the soils and climate to serve the Mid-Atlantic Coastal Plain and Atlantic Coast Flatwoods areas. The only Center serving the 13 Northeastern states is located at Big Flats, New York. While it serves most of the Northeast well, it is located on heavy, fertile flood plain soils in a climatic zone quite different from the Mid-Atlantic Coast. For example, the following table shows wide variations in length of growing season and other factors:

	Big Flats, N. Y.	Cape May, N. J.
Minimum Temperature (^{o}F)	-24	-3
Last Spring Killing Frost	May 6	April 8
Last Fall Killing Frost	Oct. 6	Nov. 12
Length of Growing Season (Days)	153	218
Average Precipitation (Inches)	32.6	37.9

The Coastal Plain area to be primarily served has heavily urbanized sections, intensively cultivated high-value farms, coastal marshes and beaches, and large areas of sandy infertile soils suitable for recreation, housing developments, industrial parks, or other non-agricultural uses. It is 600 miles long and 50 to 150 miles wide. Many of the soils are light, sandy, and easily eroded. They vary widely in fertility and moisture retention. Growing seasons are long, often with several extended periods of drouth. Minimum winter temperatures are considerably more moderate than in adjoining inland areas. As an example, plant species that are hardy in the Cape Cod area often suffer winter injury or are winterkilled in Western Massachusetts.

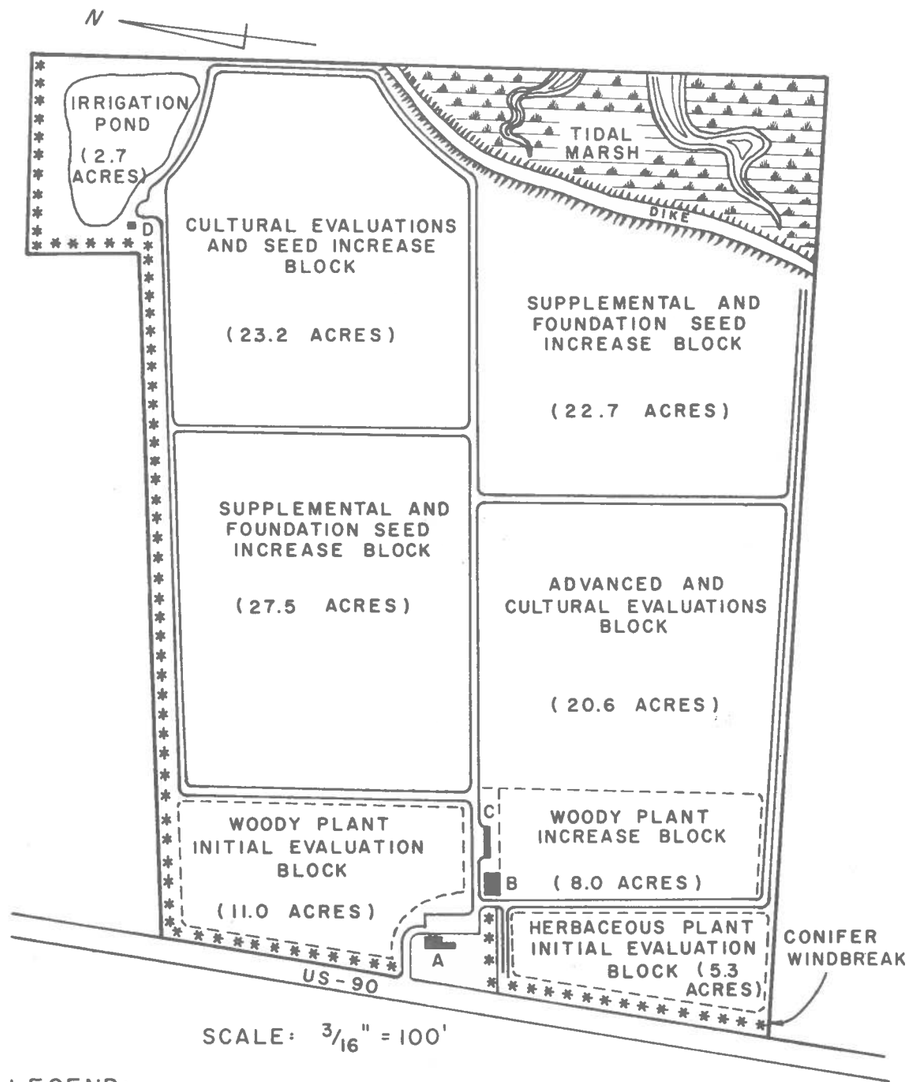
To meet the need in this important area, it is proposed that the Soil Conservation Service be authorized and provided funds to establish a Plant Materials Center for the Mid-Atlantic Coastal Plain. The Center would consist of about 100 acres of crop land. It would be located on a soil representative of the area. In addition, the Center would be located so that it would be reasonably near areas of poorly drained soils, pure sand, and brackish marshes to make convenient the establishment of off-Center studies on these problem areas. A good supply of irrigation water is important. A number of suitable sites are available in the Atlantic-Cape May County area. Preliminary investigation shows that a suitable site can be bought from private sources for about $50,000.



LEGEND

- AREA TO BE PRIMARILY SERVED BY PROPOSED PLANT MATERIALS CENTER. (COASTAL PLAIN LAND RESOURCE AREA)
- AREA RECEIVING SECONDARY BENEFITS FROM WORK OF PROPOSED PLANT MATERIALS CENTER.
- IDEAL AREA FOR LOCATING COASTAL PLAIN PLANT MATERIALS CENTER

— HYPOTHETICAL LAYOUT —
COASTAL PLAIN PLANT MATERIALS CENTER
144 ACRES



SCALE: $\frac{3}{16}$" = 100'

LEGEND:

- A – OFFICE BLDG. & GREENHOUSE
- B – SEED CLEANING BLDG., SEED & PLANT STORAGE
- C – EQUIPMENT STORAGE-SHOP
- D – PUMP HOUSE

The Center would require a set of buildings. A small office building with attached greenhouse is needed for housing the staff and conducting plant propagation or other plant experimentation. Suitable outbuildings are needed for housing equipment; for drying, cleaning, and storing seed, and for plant grading, storing, and shipping. Estimated building needs are presented in Appendix 1-3.

It is important that the Center has suitable equipment for conducting the many phases of its work. A list of needed equipment and its estimated cost is shown as follows:

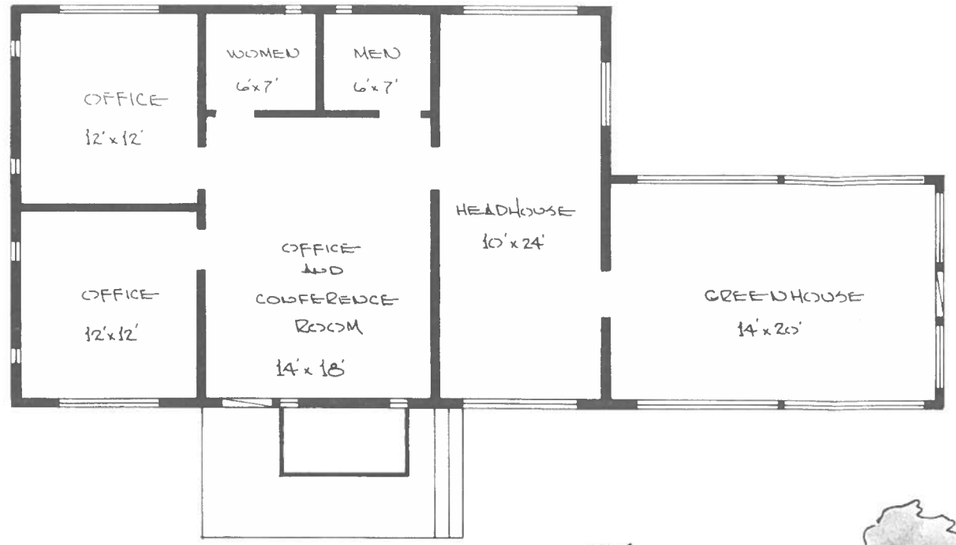
	Est. Cost
1. Wheel-type Tractor, hydraulic controls, w/cultivators, cutter-bar mower, 2-way plow, side-dressing attachment	$ 5,500
2. Garden Tractor (Gravelly type), w/cutter-bar mower, cultivators, rotary plow, 100 gal. power sprayer	900
3. Combine, 6 ft. (Allis-Chalmers or equiv.), self-powered, tractor-drawn	2,500
4. Plow, Moldboard, 3-14" bottoms	520
5. Harrow, Spiketooth, 10'	130
6. Disk, Tandem, 10'	610
7. Cultipacker, Double, 10'	490
8. Grain Drill, w/fert. attach., 8'	750
9. Fertilizer Spreader, 8'	320
10. Irrigation System, portable, w/pump	4,000
11. Pickup Truck, 3/4 T	1,800
12. Station Wagon, 6-pass.	2,000
13. Clipper Seed Cleaning Mill w/elevators, bin, hopper	1,700
14. Rice Lespedeza Huller	870
15. Small Hammer Mill w/variable speed transmission	300
16. Miscellaneous Items	
a. office furniture	800
b. small tools	310
c. other small equipment	500
Total Equipment Cost	$ 24,000

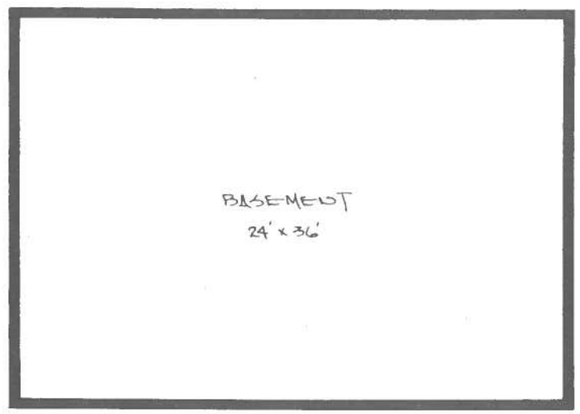
A compilation of costs involved in initial purchase of land, construction of buildings, and equipping the Center is shown in the following estimate:

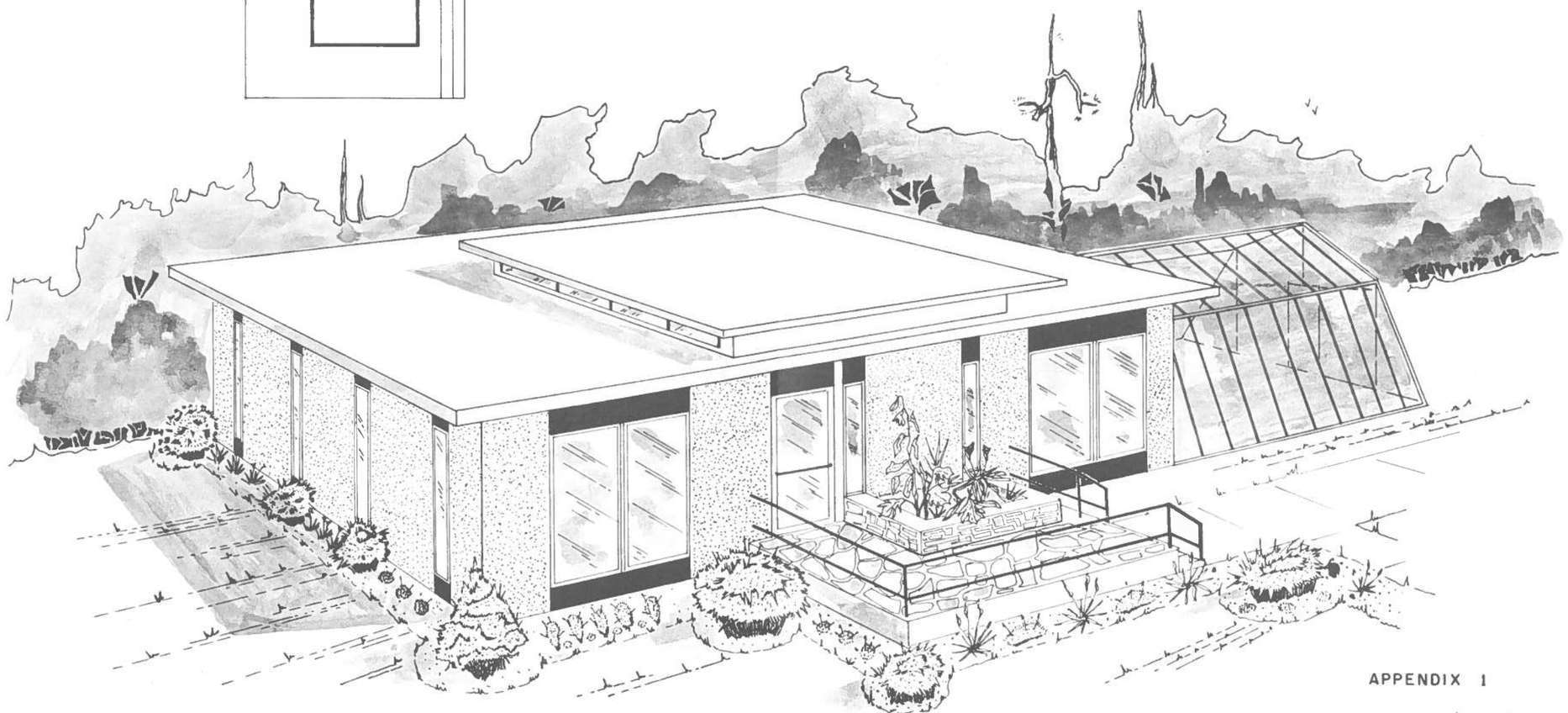
1. Land	$ 50,000
2. Buildings	
a. office and greenhouse	27,000
b. seed cleaning, plant storage	43,500
c. equipment storage	7,500
3. Equipment	24,000
Total Establishment Cost	$152,000

The Center would be staffed with one professional and one sub-professional employee. During periods of peak work-loads, four to six part-time employees would be hired from local labor sources. The annual cost of operation is estimated at $40,000.

DMC BUILDING #1
OFFICE & GREENHOUSE

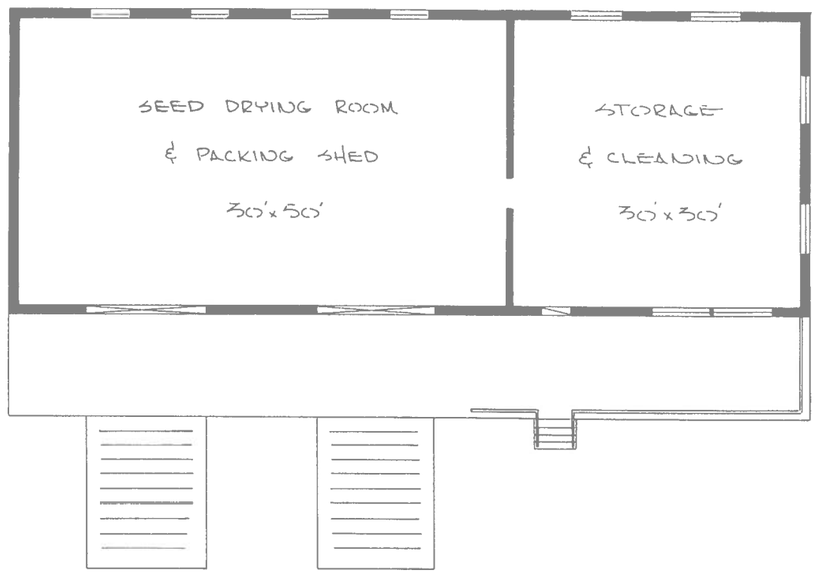






APPENDIX 1

R.D McCarthy - DJ.SCD

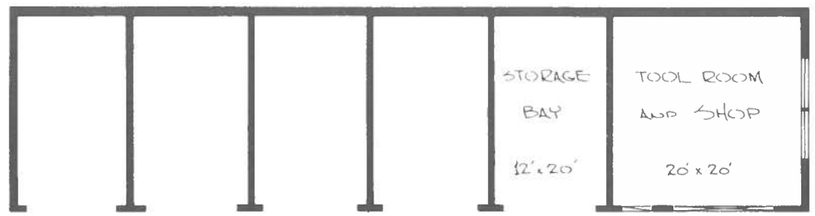


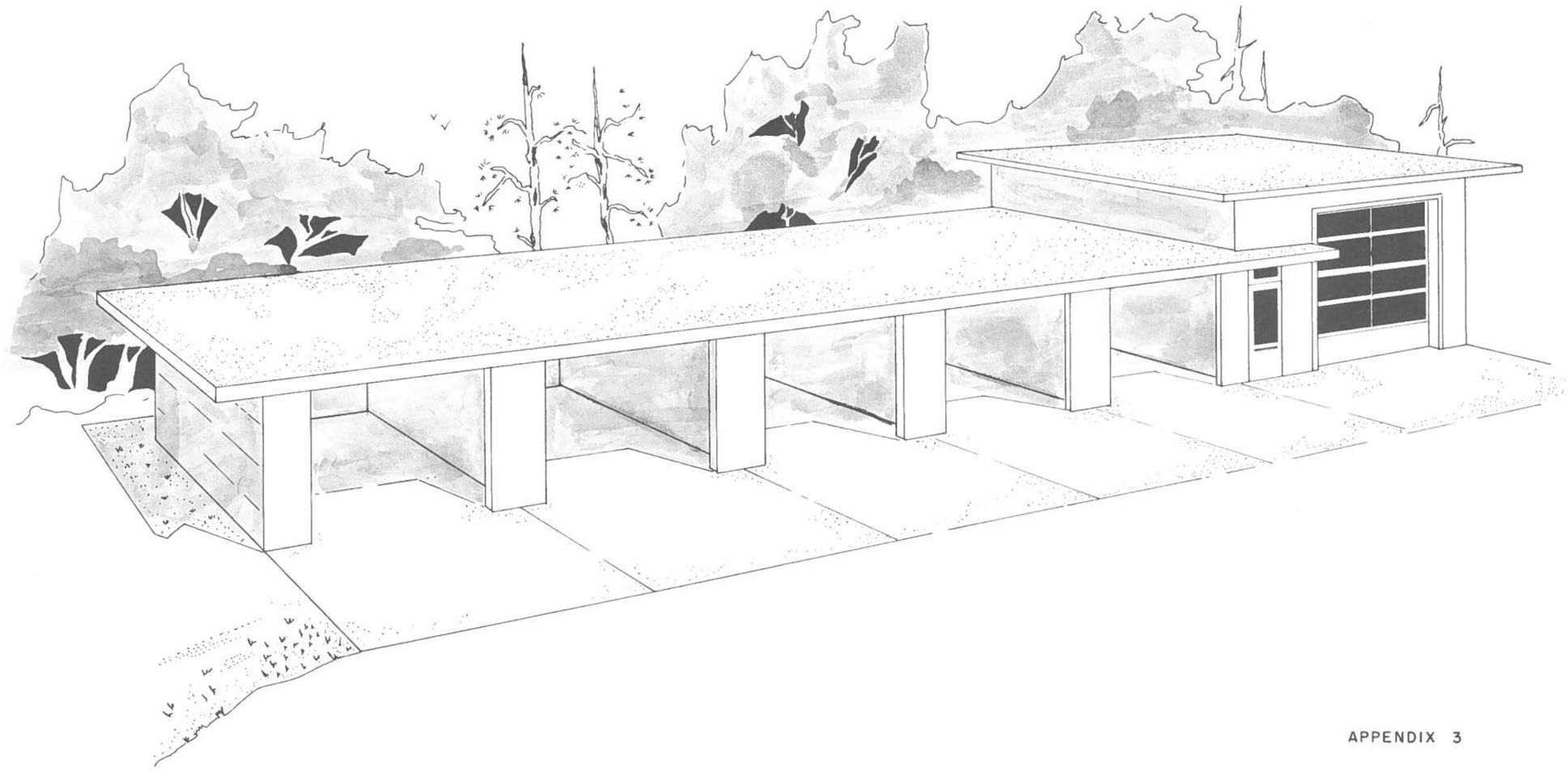
PMC BUILDING #2
PLANT & SEED HANDLING

APPENDIX 2

R.D. McCarthy NJ-SCS

PMC BUILDING #3
EQUIPMENT STORAGE & REPAIR SHOP





APPENDIX 3

R.D. McCARTHY, NTSCS

USDA-SCS-BELTSVILLE, MD. 1983